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DEPARTMENT of the INTERIOR

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Remarks of John A. Carver, Jr., Under Secretary of the Interior, at the Annual Idaho Health Conference, Sun Valley, Idaho, May 27, 1965

PESTICIDES AND MAN

I'm glad to be home, and to be introduced by the member of the family with the toughest job and the greatest talent.

The Department of the Interior has a major role in current and past governmental concern about pesticides. Rachel Carson, whose "Silent Spring" aroused the Nation to the dangers of widespread pesticide use, was an alumna of Interior's Fish and Wildlife Service.

The Secretary of the Interior, Stewart Udall, spoke out early in his incumbency on this vital and troublesome subject.

Interior is a user of pesticides and herbicides in its forestry programs, in range improvement and noxious weed control, in control of the sea lamprey in the Great Lakes, and in other programs.

Interior's current research on the long-term ecological implications of pesticides, on animals, on fish and game, and, indirectly, on man himself, is widely heeded because Interior serves as a national governmental conscience as far as wildlife-pesticide relationships are concerned.

Interior is not opposed to pesticide use per se, for as a Department we know the benefits of the use of these chemicals.

We also know that we don't know very much. We don't even know the right questions.

This, in short, is at the center of much of the current controversy. Public concern mainly is about the unknown consequence

of the large-scale use of pesticides.

For perspective on the facts of pesticide use, consider that in the most recent year for which figures are available, we used an estimated three-quarters of a billion pounds of pesticides on an area equivalent to about 5 percent of the land area of the United States. Pesticide use has almost doubled in the last decade. Prior to 1945 pesticides were used very little.

The controversy over pesticides exists on several levels. Biologists, chemists, and related scientific researchers disagree about both the magnitude of the pesticide problem and about the character of the problem.

Agricultural scientists generally point with considerable pride to the increased crop yields attributable to pesticides and tend to downgrade the "dangers" seen by some other scientists.

Wildlife biologists point to an opposing array of data which suggest that the higher crop yields may be achieved at the "cost" of fish or wildlife, or they point to danger signs which signal added caution or outright non-use.

The controversy is also economic. Farmers need to cut costs; consumers want bug-free produce; and alternatives to pesticides may be years and untold dollars away, if, in fact, a suitable alternative exists and can be found.

The controversy is political, because the decision to spray or not to spray is often made by government, as user or as regulator.

Political administrators have become highly sensitized to the complexity of the controversy.

At times it is difficult to believe who have been identified as villain. The National Park Service as an organization probably has more sensitivity than most Government agencies to natural values. Yet, a few years ago, that agency was cast as the villain when it attempted to control an outbreak of lodge-pole leaf miner in a narrow band around the campgrounds in Yosemite National Park.

Part of the scientific controversy over pesticides stems from a deep-seated American characteristic--namely, the presumption of innocence until proof of guilt. This admirable trait of Anglo-Saxon criminal law runs into trouble when dealing with drugs and chemical compounds like pesticides. I need not, for this group, elaborate on the relevance to drugs.

Under a doctrine of presumed innocence it is logical but well-nigh impossible to require scientific proof that the presence of these substances in small quantities over a long period of time can or does cause some kind of detectable damage, except when such damage is widespread and of visible dimensions.

No one denies that pesticides can be misused. It is not the accident of misuse, but the effects of "normal" uses that suggest the need for considerable caution and a conservative posture about the widespread dissemination of these materials in the environment.

Though it is true, as I mentioned earlier, that only some

5 percent of the land area of the United States is treated annually with pesticides, this 5 percent breaks down into two categories--one group of lands which are intensively re-treated every year, and another group of lands treated for the first time. No one knows exactly what percent of the United States has been treated with long-lived pesticides at one time or another during the last 20 years, but we do know that it is substantially impossible to find any land any place in which pesticide residues cannot be detected. The same is true for water and the entire biotic community. Small quantities of pesticides become airborne and travel very long distances. Other pesticides become involved in the complex hydrologic cycle and the ecology of food chains.

The Department of the Interior is very much concerned about some of the disturbing ways in which pesticides turn up in some highly unlikely places. You perhaps saw the story recently in which it was reported that DDT was found in penguins in Antarctica. Pesticides can be found in fish and sea mammals hundreds of miles from shore and among species whose non-migratory life is confined to great depths.

We do not know how the chemicals reach these places. But there they are.

The pesticide controversy is by no means limited to its effects on sport fish and wild game. It also deeply involves this Nation's multimillion dollar commercial fishing industry. Commercial fishermen, like housewives shopping in the supermarket, have no control over the way in which pesticides reach their product. The effect may involve residues in the tissue of fish destined for human

consumption or it may involve the effects of pesticide on the complex ecology of our coastal estuaries, which serve as nursery areas for many species of fish and shellfish.

Another element of the controversy surrounds the basis on which judgments are made about whether a pesticide is "good" or "bad." From the point of view of a pesticide manufacturer and a farmer who may use it, a "good" pesticide is one which effectively and efficiently does the job for which it is designed. Does it kill the bug or bugs which are its target?

According to the President's Science Advisory Committee, there has been in the past too little consideration of the wider effects of pesticides on both the animal and fish population and on man himself.

Much of the Interior Department's pesticide research programs is geared to studying the long-term effects on wildlife populations. Evidence to date supports the conclusion that the chronic effects of pesticides, particularly in the form of reduced fish and wildlife reproduction rates, are more serious than mortality which follows a spraying operation.

Residues in fish and wildlife consumed by other animals in the food chain will be magnified. Earthworms fed on plant material contaminated by DDT used against Dutch elm disease in Michigan stored the pesticides in their bodies and robins ate the worms. Many of the birds died of acute DDT poisoning; brain tissues showed DDT present in quantities as high as 120 parts-per-million.

Man is a part of the food chain where game animals and fish are involved. Though wild game probably doesn't constitute a significant percent of the annual diet of many adults, this source of residue has to be taken into account in the study of whole-diet accumulations of these and other toxic materials.

In recent years an added complicating factor has been introduced into the argument--the perplexing but fascinating element of quantity or scale.

Chemical substances were once measured in grams and milligrams and gallons and ounces. New research techniques made it possible first to talk about parts-per-thousand, then parts-per-million, then parts-per-billion; today it is possible to detect concentrations of pesticides in parts-per-trillion.

To understand what these magnitudes mean, one part-per-billion is one ounce of vermouth mixed equally in a thousand railroad tank cars of gin. A very dry martini indeed!

If you move then to discussions of parts-per-trillion, the difficulty of scale can only be compared to those inherent in trying to understand light years and the distances to the stars.

The administrator and business and governmental decision-makers, when the concept of "none" is unavailable, have serious problems. "Some" poison is hard to justify in regulations. A few parts-per-million of a particular pesticide may be illegal, it might be lethal to something or other, and it may be so important as to require major counter measures in order to prevent substantial

economic loss. Or it may be meaningless.

The impact can be enormous. Dairy farmers near Washington in whose milk very small quantities of pesticides were found, lost thousands of gallons of their product, and the profits that product would bring, when for months it was necessary to dump the milk.

It will soon be possible to detect quantities of parts-per-trillion magnitudes in samples as small as one quart--or, to continue my analogy, it would be possible to take a single fifth of gin from that train of a thousand tank cars and be able to detect the vermouth in it.

The problem of scale goes to the heart of the present-day research needs. We know almost nothing about the biological and toxicological significance of very small quantities of these chemicals. We know even less what the genetic effect of long-term low-level exposure may be, either in animals or man. Nor do we know what happens when these chemicals are mixed in small quantities over long periods of time. As you know, two plus two does not always equal four in the synergism of chemical reactions.

To be sure, we have little evidence that great harm has already been done or that worldwide disaster is only around the corner. But this gets me back to the presumption-of-innocence argument, and the controversy has not yet been resolved. Clearly, we must know much more than we do now.

Research to date has demonstrated some remarkably disturbing

facts about very small quantities of these materials:

. . . DDT concentrations of one part-per-billion will kill blue crabs in 8 days.

. . . Commercial brown and pink shrimp exposed to 0.3 to 0.4 parts-per-billion of a widely used pesticide were paralyzed in 48 hour laboratory tests (in the lab, paralyzed fish or shellfish may live for days, even weeks, but in the sea, where only the fittest survive, death may come immediately.)

. . . A concentration of 5 ten-thousandths of one part-per-million of DDT proved toxic to shrimp after 72 hours.

. . . Oysters have a mysterious capability to soak up DDT from water containing fantastically small concentrations. Oysters exposed to DDT at 0.5 parts-per-million in small aquaria removed over 50 percent of the pesticide from the water within 6 hours and 96 percent in 2 days. Under experimental conditions the oyster detects and stores pesticides present in the water at concentrations as low as 10 parts-per-trillion.

If these experimentally demonstrated facts sound unduly negative, I should add that Department researchers have experienced some success in detoxifying pesticides by micro-organisms which feed upon chlorinated hydrocarbons.

It was no accident that President Johnson included a special section on pesticides in his historic message of February 8 to Congress on Natural Beauty. Though the relationship of chemicals to natural beauty may seem at first to be remote, the concern of the President

for the quality of man's total environment required inclusion of this vitally important topic.

Secretary Udall last September issued rules governing the Department's own pesticide programs. He has required that first priority be given to non-chemical methods of pesticide control. When chemicals are proven necessary, safety will be the main consideration.

Additional safeguards governing the choice of chemicals used, minimum dosages with the safest carriers and thorough studies both before and after application are now standard practices with Interior. The Secretary's order also requires that advice be obtained from State fish and game departments and State and local health officials before there are any extensive uses near water areas.

The Department has recently also taken steps toward accelerating the Interior Department's research program in pesticides by asking the Congress to eliminate a ceiling now imposed on these efforts.

In the meantime, and until research provides more answers to a growing number of questions, care and prudence will be the guideposts. This certainly is why President Johnson asked for close monitoring of pesticide level in water, air, soil, and food supplies.

If the problems of pesticides occasionally seem to be the province only of the scientists or of the politician, it is because politics and science are inextricably wedded in this age of technology. One of the major problems facing all levels of government is the general

inability of our social institutions to keep pace with technology.

Few scientists venture into the realm of political controversy and there is often great reluctance on the part of politicians and administrators to trust non-scientific advice and judgments of the professional scientists.

At the same time it is an easy trap for political decision-makers to become the intellectual prisoners of their own technicians. It takes considerable courage, let me assure you, for administrators to buck the weight of "technical advice." Too often major questions, such as when, where, and how a pesticide is used becomes buried in the technical echelons way down the bureaucratic ladder. Like economics which is too important to be left to economists, pesticides are too important to be left to technicians.

I think we are headed in the right direction as far as pesticides are concerned. Research has been accelerated. New Government safeguards covering manufacturing and labeling and registration have helped enormously. Industry has evidenced considerable concern and progress following an initial blast that could hardly have been considered as statesmanlike.

Though the controversy remains and will continue--because the issues are real and like most issues cannot be resolved into questions of black and white or right and wrong--no one I know of seriously believes pesticides will be used any less tomorrow than today. I hope we will use them more carefully tomorrow and with more knowledge about both short-term and long-term consequences.

The Department of the Interior intends to keep this issue before the conscience of the Nation in a responsible way--both for the present and the future.

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